

Figure 4.4.2 Formant plot of nasalized vowels of Kpando speakers. in= ĩ , en= ẽ , ern= ẽ̃ , an= ã , un= ũ , on= õ and orn= õ̃ .

Figure 4.4.2 is the formant plots the speakers of the Kpando dialect. The front nasalized vowels produced by these speakers are located in the same region as the oral ones but the back ones are a little shifted from the back toward the center with $[\text{ã}]$ overlapping with $[\text{õ̃}]$. However a paired sample t-test conducted to ascertain the main effect of these vowels on each other shows that there is a difference between them. For F1, the level of significance is at $p < 0.002$ and for F2', $p < 0.006$. This is an indication that there is a significant difference between both F1 and F2' of these vowels.

A test the difference between the overlapping and clustered vowels for all speakers produced the following result:

Table 4.4.1 Paired sample T-test for main effect and interaction of the vowels $[\text{e}]$, $[\text{ɛ}]$, $[\text{ə}]$, $[\text{u}]$, $[\text{o}]$ and their nasalized counterparts for Kpando speakers.

Vowel Pairs	Paired Differences				t	df	Sig. (2-tailed)
	Mean	Std. Dev.	Std. Error Mean	95%confidence Interval of Difference			

				Lower	Upper			
e-ε	-6.30	80.08	175.84	35.89	5.83	154.33	23	.036
e-ə	165.23 81	147.0992	32.0992	98.280 2	232.195 9	5.148	20	.000
ε-ə	75.142 9	87.9973	19.2026	35.087 0	115.198 8	3.913	20	.001
ẽ-ẽ	- 661.21	3004.06	715.26	-2140.84	818.43	-924	23	.365
ẽ-ə	137.21	338.28	69.05	-5.64	280.05	1.987	23	.059
ẽ-ə	789.42	3474.09	709.15	-668.56	2265.40	1.126	23	.272
u-o	4.17E. 02	185.53	37.87	-78.30	78.38	.001	23	.999
ũ –õ	-75.74	224.62	49.02	-177.39	27.10	1.533	20	.141

The above experiment indicates that there is no significant difference between the pairs except [e] –[ə] and [ε]- [ə]. A further test was however conducted on the pairs [e] –[ə] and [ε]- [ə] to assess the reason for their cluster on the scatter plot. There is a significant difference of $p < 0.05$ for F1 of the pair [e]-[ə] but no difference for F2' at $p < 0.040$. This is an indication that Kpando speakers differentiate between the height of [e] and [ə] but do not vary their front-back dimensions. There is no distinction however between both F1 and F2 for the pair [ε]-[ə].

4.5 Tɔŋu Speakers

Figure 4.5.1 below is the formant plot of ten speakers of the Tɔŋu dialect.

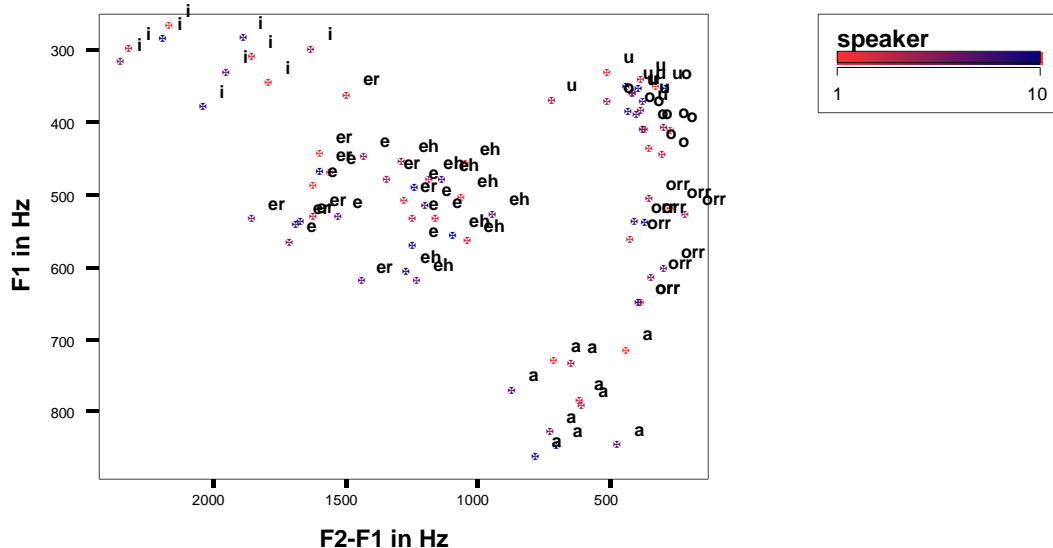


Fig 4.5.1 Formant plot of oral vowels of Tɔŋu speakers. er=ɛ, eh=ə and orr=ɔ.

The Tɔŋu speakers recorded had [i] located in the high front part of the vowel chart with F1 ranging from 270 and 385 Hz. However those of speakers 1,4, 6, 9 and 10 are more front with F2' ranging from 2000 to 2400 Hz while the other speakers had it located less front with F2¹ ranging between 1600 and 2000 Hz. Their mid front vowels are all clustered around the middle with F1 ranging from 440 and 600 Hz and F2' ranging from 1150 to 1900 Hz, with [ɛ] lying just above [e]. [ə] was produced within the same F1 ranges as [e] and [ɛ] but with F2' between 940 and 1290 Hz. The test of variance of these vowels shows almost 99% of no difference between the vowels of the different speakers. All speakers had [a] located at the back with F1 of 720-870 Hz and F2¹ of 440-880 Hz. The back vowels [u], [o] and [ɔ] of these speakers are located near the periphery of the formant chart with F2¹ values between 276 to 520 Hz except [u] of speaker 5 which is shifted to the center at F2¹ region of 724 Hz.

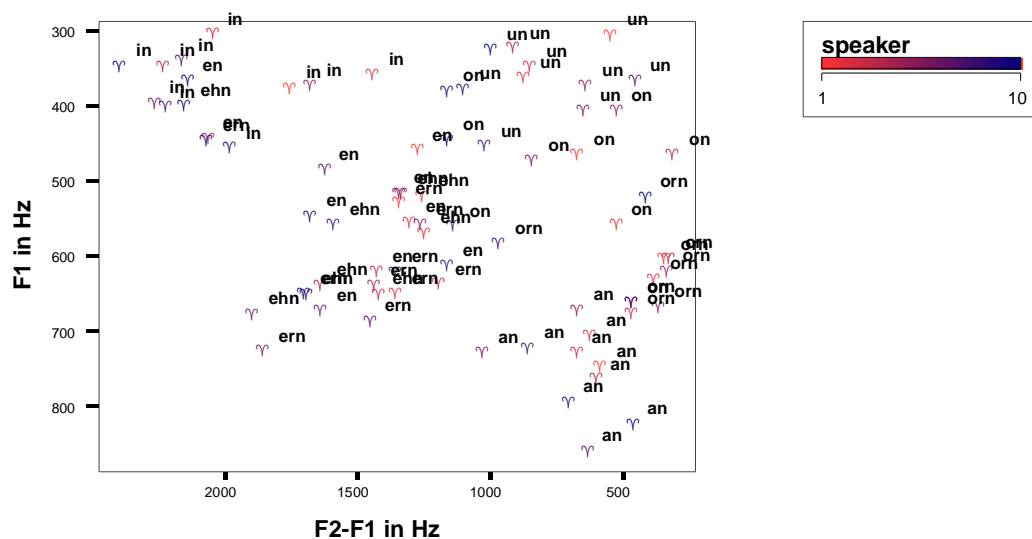


Figure 4.5.2. Formant plot of nasal vowels of Tɔŋu dialect.

in=ĩ , en=ẽ, ern=ẽ̃, an= ã, un=ũ, on=õ and orn= õ̃.

The nasalized vowels produced by the speakers of this dialect too do not clearly show up at the traditionally ascribed locations of their oral ones on the formant chart. They are very scattered on the chart. But it must be mentioned that for some of the speakers, the front vowels are clearly located in the front and the back ones scattered at the back.

Analysis of variance to test the difference between the overlapping and clustered vowels for all speakers produced the result shown in Table 4.5.1.

The indication of the result (Table 4.5.1) is that Tɔŋu speakers do have a significant difference between all the pairs except [e]-[ɛ], [e]-[ə] and [ɛ]-[ə].